

PostView

VERSION 1.2

USER'S MANUAL

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Chapter 1- Getting Started

1.1 Overview of PostView

PostView is a finite element (FE) post-processing application that is designed to view *FEBio* output files. It offers several post-processing capabilities, such as generation of surface plots, isosurface plots, plane cuts, and many more. A short list of features supported in the current version:

- Graphical User Interface (GUI)
- Command Line Interface
- Command Line Calculator
- 3D visualization of model and data
- Diverse plotting modes for visualization
- Customizable Graphics View

The GUI of PostView allows the user to interact with the FE model in an easy and intuitive manner. For the more advanced user PostView also offers a command line alternative.

In addition to reading FEBio output files, PostView can read several file other file formats, including LSDYNA keyword and database files, NIKE3D input and output files and FEBio input files. It also allows the user to import user defined data, offering a flexible tool to accommodate the analysis of results from other FE software programs in PostView. Other file formats are often added based on the needs of our user community, so if a format that you need is not yet supported, please contact us through the PostView forums to log a feature request (<http://mrl.sci.utah.edu/forums/>). Additional file formats for import can usually be added within a few days.

1.2 Running PostView

1.2.1 System Recommendations

PostView runs on Windows XP, Linux and MAC OSX. In order to run PostView, a memory size of at least 512 Mb is recommended. Larger models may require more memory. A processor speed of at least 1 GHz is also recommended. The computer's graphics card must support OpenGL, since the application makes extensive use of this 3D graphics library.

1.2.2 Command Line Options

When starting PostView from the command line under Unix, Linus, or Mac OS/X, the full syntax for the command is:

```
>postview [filename]
```

Here, *filename* is the optional name of an FEBio plot file. If a filename is specified, the file will be loaded into the PostView environment when PostView executes.

Chapter 2- Tutorial

This chapter describes some of the main features of PostView by using a sample FEBio output file that comes with the PostView distribution. The sample is called “*sample.plt*” and shows a cylinder contacting a deformable box.

In this tutorial you will learn:

- to open an existing FEBio output file
- position the model in the graphical view
- change a few viewing options
- saving a screenshot of the display

2.1 STEP 1: Opening the sample plot file

To open the sample plot file, select the File/Open menu. A standard file dialog box appears. Select the file *sample.plt* from the PostView installation folder and click OK. This should load the sample data into PostView. After loading, the display should look similar to Figure 1.

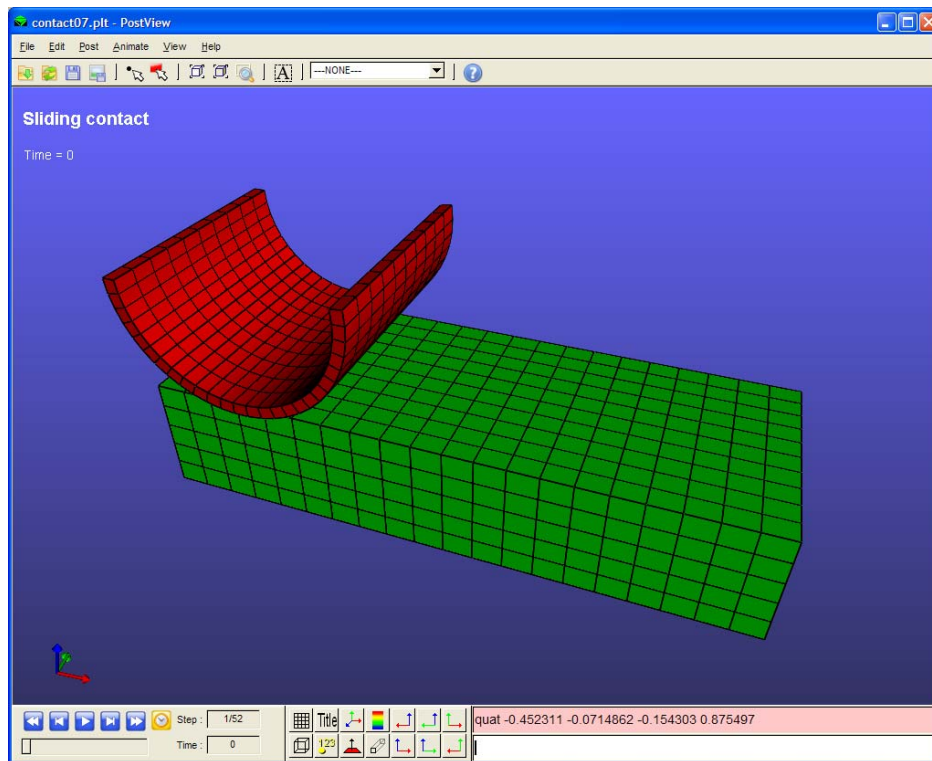


Figure 1. Screenshot of the sample plot file.

You can see the model in the *Graphics View* (GV). By default, the color display by default does not show any data values, but rather assigns unique colors to each material. In the upper-left corner, below the title of the plot file, you can see what is being displayed. When an expression field is selected, the name of the expression will appear

here. A vertical colored bar showing the legend will also appear on the right of the graphics view.

2.2 STEP 2: Setting some options that affect the display

Moving to the last timestep. In this step we will change a few settings so we can display what we really want. The first thing we'll do is go to the last timestep. This is done by selecting the far right button (>>) on the time controller, located in the lower left of the window. This will advance the solution to the last timestep. You can also push the *next timestep* button (>|) to advance one step at a time until you reach the final timestep. Still another way is, when positioned on the very first step, to push the *previous timestep* (|<) button which will loop the solution to the last step. To continuously loop through each timestep, the *play* (>) button can be pushed.

Positioning the model. You can rotate the current view of the model by holding down the left mouse button while dragging the cursor over the Graphics View. By click+dragging the right mouse button, you can also zoom in or out. To move the model left, right, up or down simply click+drag the middle mouse button.

Changing the surface expression. By default, when loading a data file, PostView will not display any value on the surface. To change this, open the post options dialog by selecting the *Post/Options* menu. You should see the Options dialog box, such as displayed in figure 2.

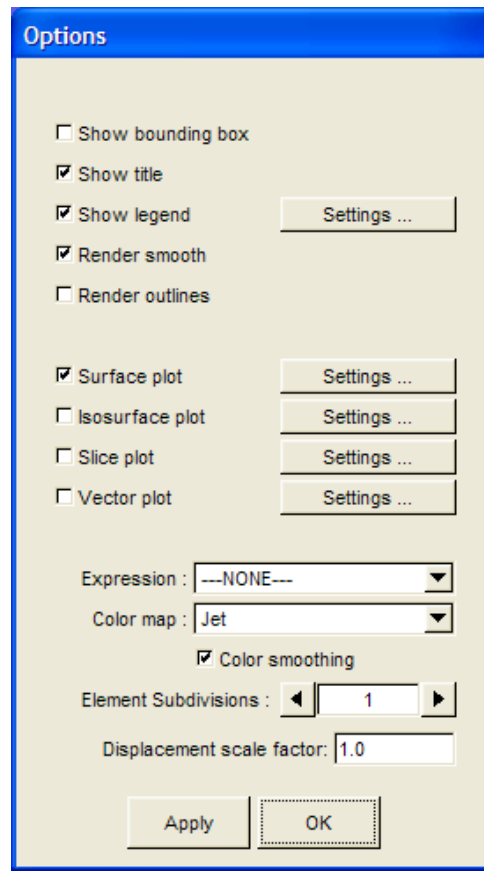


Figure 2. The Post-options dialog box.

To change the expression for the surface, select the drop-down box named *Expression*. Now select *Effective Strain*, found in the *Strain* submenu. After selecting OK, the graphics view will be updated in accordance with the new settings. Alternatively, you can also select the expression from the toolbar, located below the main menu.

2.3 STEP 3: Saving a screenshot

In this step we will save the current graphics view to an image file. First, we need to select the part of the screen we wish to save. Display the *safe frame* by selecting the *View/Toggle Safe Frame* from the menu. The safe frame surrounds the area of the screen that will be stored. You can move it around by selecting and moving its borders. To resize it, select and drag the triangular area in the lower right corner. For precise positioning, select the *Edit/Properties* from the menu, or double-click on the frame. A dialog box will appear that allows you to enter the position and dimensions manually. With the safe frame in place, we can now go ahead and save the view. This can be done by either selecting of *File/Snapshot* from the menu (or pressing its shortcut *ctrl+p*) or by pressing the *Snapshot* toolbar button. A standard file dialog box now appears that allows you to select a file type and enter a filename.

This completes our tutorial. The points to remember are:

- Use *File/Open* to open an existing plot file

- You can use the mouse to position the model by left or right-click-dragging
- The *Post/Options* menu shows a dialog box where you can change the viewing options
- The *File/Snapshot* menu you can use to save the current graphical view to an image file

Chapter 3- The PostView Environment

3.1 The GUI

PostView has a Graphical User Interface (GUI) that offers an easy and intuitive way to interact with the FE model. Figure 3 shows the GUI when the program starts and after the sample file is loaded.

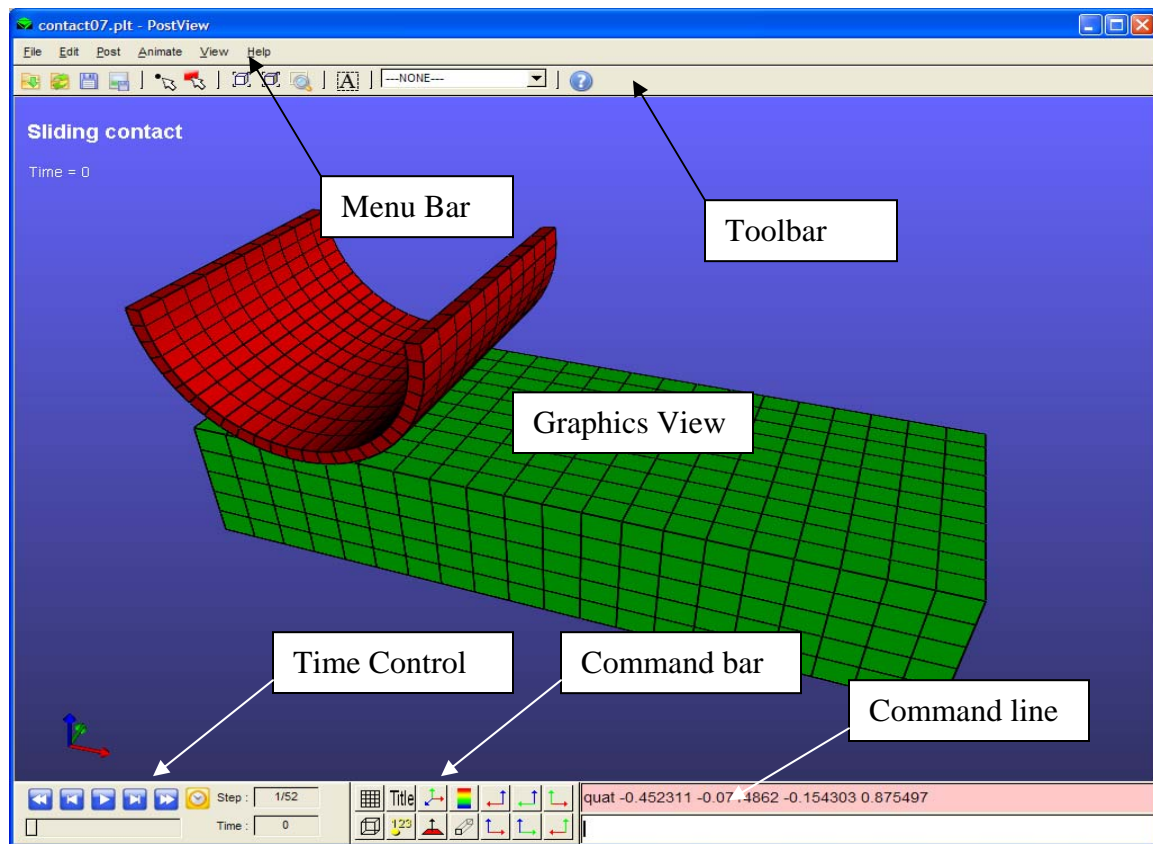


Figure 3. The GUI after the sample file has been loaded

The GUI consists of several items. The *Menu Bar* at the top allows access to the various PostView options and settings. Located below the menu bar is the *Tool Bar*. The *Graphics View* (GV) shows a 3D view of the FE model. At the bottom left, the *Time Controller* is used to select the timestep that is being displayed. To the right of the *Time Controller* is the *Command Bar*, which offers a quick way to access commonly used commands. The *Command Line* can be found in the lower right part of the screen and can be used as an alternative to invoke PostView commands.

3.2 The Menu

In this section we will give an overview of the different menu items that can be found in PostView. The main menu bar, located at the top of the window, consists of the following items:

- *File* – file operations, such as opening and saving data.

- *Edit* – options that apply to the current selection, such as hiding, un-hiding, etc.
- *Post* – do some post-process operations and set the post-processing options
- *Animate* – record an animation of the current Graphics View
- *View* – provides options to customize the *Graphics View*
- *Help* – allows access to PostView help and the About dialog box

A more in-depth description of the different menu items follows.

3.2.1 The File Menu

The file menu gives access to file operations and has the following menu items:

- *Open* – Opens a plot file
- *Save* – Saves the data to file
- *Update* – Reload the last loaded data file
- *Export* – Export the current model to file
- *Model Info* – Displays information about the currently loaded model
- *Snapshot* – Take a snapshot of the current GV
- *Exit* - Quits the application

3.2.2 The Edit Menu

The edit menu gives access to operations that apply on the current selection:

- *Hide Selected* - hides the current selected elements
- *Hide Unselected* - hides the non-selected elements
- *Invert Selection* - inverts the current selection
- *Unhide All* - Un-hides all the previously hidden elements
- *Select All* - selects all visible elements (invisible elements remain unselected)
- *Clear Selection* - Clears the current selection
- *Delete* – deletes the currently selected object from the GV
- *Properties* – modify the properties of the currently selected GV object

3.2.3 The Post Menu

The post menu allows the user to set many of the options that effect what is being displayed.

- *Options* - Set many of the options that effect what is being displayed
- *Summary* - Provides some 2D plots of several fields such as displacement, strain, stress, etc.
- *Plane Cut* - Displays a plane cut view of the model.
- *Statistics* – Displays a bar chart of the currently displayed data
- *Trackview* - Shows a time history of selected nodes or elements
- *Material Manager* - Displays the *Material Manager*
- *State Manager* – shows an overview of the states of the model

3.2.4 The Animate Menu

The Animate menu gives the user access to the recording capabilities of PostView.

- New – Select a new target file for the animation
- Start recording – start recording the GV and store the frames to a file
- Pause recording – pause the current recording
- Stop recording – stop the current recording and close the target file.

3.2.5 The View Menu

The view menu allows the user to choose options that customize the display.

- *Settings* - Set foreground and background colors and style
- *Toggle Safe Frame* – displays or hides the safe frame.

3.2.6 The Help Menu

The help menu allows access to the help features available in PostView and access to the software version and developers information.

- *PostView Help* - Opens the Help window
- *About* - Displays the about box

3.3 The Toolbar

The *toolbar* is located below the menu bar and allows quick access to several menu items:



Opens an existing plot file.



Reloads the currently loaded file



Saves the currently loaded model



Saves a screenshot to file.



Switches to node-selection-mode.



Switches to element-selection-mode.



Zoom in on the selection



Zoom to the extents of the scene



Zoom in on a rectangular selection



Add a text box to the GV



Select the current displayed expression.



Displays the PostView Help window.

3.4 The Command Line

The command line, located at the bottom right of the screen, gives the user an alternative way to invoke PostView commands. Most of the commands can be issued from here by just typing the name of the command. In addition, the command line can also be used as a simple calculator.

3.4.1 Using the Command Line

Commands can be entered on the command line by typing the command name, followed by the command arguments, if any. For example, the command to open a file is simply *open*, followed by the filename:

```
>open sample.plt [enter]
```

To repeat the last command, type an exclamation mark (!). So, for example, the following two commands will advance the timestep twice:

```
>next [enter]
>! [enter]
```

Help for a command is also available by preceding the command name by a question mark (?). For example, to find out what the *title* command does, type:

```
>? title [enter]
```

Note the space between '?' and '*title*'.

Appendix A gives a detailed description of all available commands. Some commands do not have a menu alternative and thus can only be invoked from the command line.

3.4.2 The Command Line Calculator

The command line can evaluate simple arithmetic expressions by first typing the equal sign (=), followed by the expression. So, for example the following command,

```
>= 5.2+3*(4.1-3.6) [enter]
```

will give the result 6.7.

The Command Line calculator recognizes the basic arithmetic operators (+, -, *, /), the power operator (^), floating point representation (e.g. 3.1415) as well as exponential representation (1.03e2), parentheses, a set of predefined named constants,

```
pi = 3.14159265
e = 2.71828182
```















and a set of arithmetic functions:

```
cos = cosine of argument
```

sin = sine of argument
tan = tangent of argument
ln = natural logarithm of argument
log = base 10 logarithm of argument
sqrt = square root of argument

3.5 The Command Bar

The *Command Bar*, which is located between the time control and the command line, gives access to several commonly used commands. By simply clicking on the button the command is executed. When holding the mouse cursor over a button, a tooltip will appear, which gives the command that corresponds to the button. Most of these commands (e.g. mesh, image, title, etc.) are toggle buttons, so clicking it once deactivates the option and by clicking it again, the option is reactivated.

	Toggle the mesh
	Toggle the bounding box
	Toggle the title
	Toggle the tags
	Toggle the triad
	Toggle face normals
	Toggle the legend
	Switch between perspective and orthographic projection
	Top view
	Bottom view
	Left view
	Right view
	Front view
	Back view

Chapter 4- The Graphics View

4.1 Elements of the GV

The Graphics View (GV) is the area of the screen where the model is displayed. Aside from a 3D rendering of the model, the GV has several other components to it. The image below displays the GV and all of its default components.

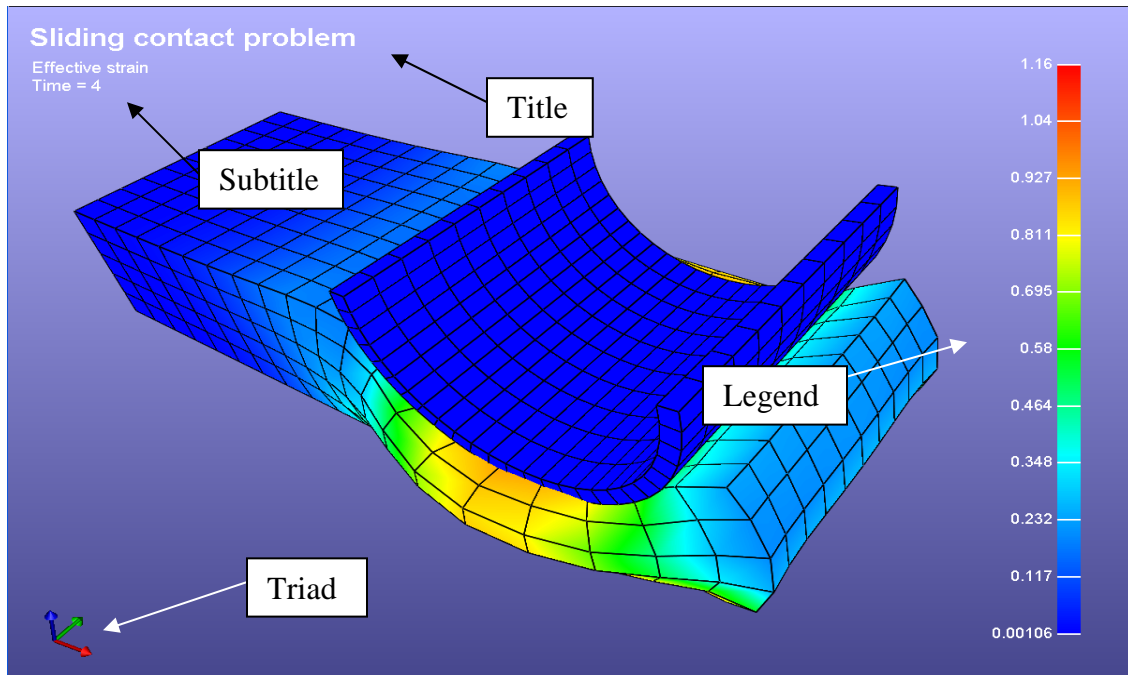


Figure 4. The Graphics View components

The *Title* component displays the title of the model. The *subtitle* displays additional information, such as selected field and current time value. The *triad* indicates the current orientation of the scene. Finally, the *legend* displays a colored bar and the range of the selected field.

4.2 Customizing the GV

The user can customize the GV by selecting and moving the different components around, and by adding new components. This section describes how the user can customize the GV. The following GV objects are currently available:

- *Text box*: display a user-defined text
- *Triad*: display the orientation of the current view
- *Legend*: display a colored legend bar

4.2.1 Selecting and moving objects

You can select a GV object by clicking on it with any mouse button. A selection box appears over the object. The object can be moved by dragging the box, while holding the mouse button down. If you click and drag the small triangular shaped area in the lower right corner of the selection box, you can resize the object. Double-clicking on an object brings up a properties dialog box, where you can modify the object's properties.

4.2.2 Setting the GV object's properties

After selecting an object, you can alter its properties by selecting Edit/Properties from the menu. A dialog box appears. You can also bring up this dialog box by double-clicking on the object. Below is an example of the properties dialog box for a text object.

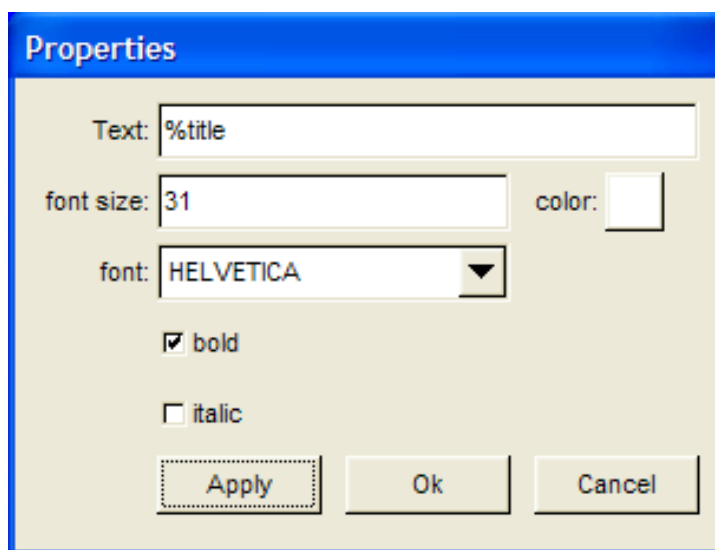


Figure 5. Text properties.

The font type, font size, font color and attributes can be set in this dialog box. Note that not all combinations of fonts and font attributes are supported. You can also set the text to be displayed in the box. The text can consist of literal text and keywords. The keywords, which start with a percentage sign (%), will be replaced by a predefined text. The available keywords are listed in table 1.

keyword	description
<i>title</i>	Title of the problem. The title is set in the File/Model Info dialog box.
<i>field</i>	The field variable currently being displayed.
<i>time</i>	The time value of the current state
<i>state</i>	The current state number
<i>filename</i>	The name of the file
<i>filetitle</i>	The title of the file, i.e. the filename without the extension
<i>filepath</i>	the path of the file

Table 1. Text box keywords

You can also use escape sequences, which start with a backslash (\).

- \n: start a new line
- \t: start the following text at the next tab position

4.2.3 Adding GV objects

PostView starts with a predefined set of GV objects. You can add new objects by clicking one of the GV buttons in the toolbar. Currently, PostView supports the addition of a new text object by clicking on the “Add text box” button.

4.2.4 Deleting GV objects

GV objects can be removed by first selecting them and then selecting Edit/Delete from the menu bar. Note that you cannot delete the predefined objects, namely the title, subtitle, legend and triad. However, you can hide these objects by selecting the corresponding button on the command bar.

Chapter 5- Post Processing

5.1 Setting Post Viewing Options

Most of the settings that affect the display in the Graphics View are accessed through the Options dialog box. This can be done by selecting the *Post/Options* menu, pressing the F2 shortcut or by typing `options` on the command line. Next, the Post Options dialog box will be displayed and looks like figure 5.

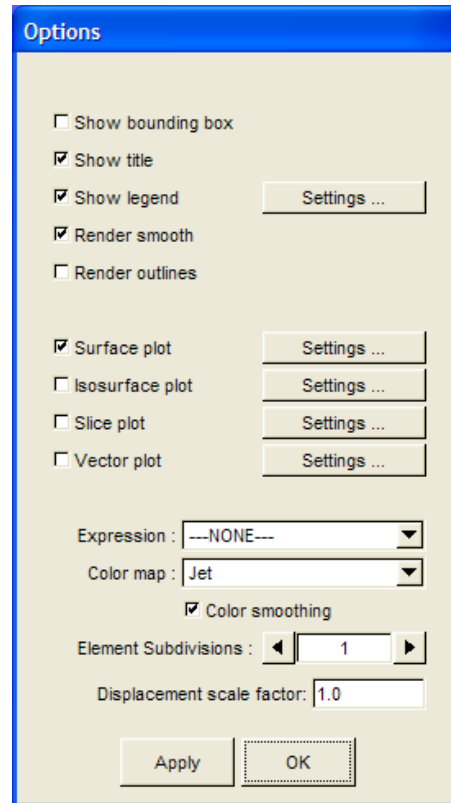


Figure 6. The Post Options dialog

The following settings can be set in the Post Options dialog box:

- **Show bounding box:** display a box that represents the geometrical range of the image data.
- **Show title:** display the title in the GV.
- **Show legend:** display the legend in the GV. By pushing the settings button next to it, additional parameters that affect the way the legend is displayed can be selected.
- **Render smooth:** if selected, uses Gouraud shading to display the plots. If not, flat shading is used.
- **Render outlines:** render the outlines of the model. For best results, turn off the mesh.

- **Surface plot:** show a plot of the exterior surface of the model. The color of the model is based on the selected expression. Additional settings for this type of plot can be set by clicking the *Settings* button next to it.
- **Isosurface plot:** shows an isosurface plot of the expression. Additional settings for this type of plot can be set by clicking the *Settings* button next to it.
- **Slice plot:** shows a slice plot of the expression. Additional settings for this type of plot can be set by clicking the *Settings* button next to it.
- **Vector plot:** shows a vector plot. Click on the *Settings* button to change the vector plot options.
- **Expression:** affects what is being evaluated and displayed as the texture on the mesh. See appendix B for an overview of the available selections.
- **Color map:** selects the color map that is used to color the mesh, based on the local values of the evaluated expression.
- **Color smoothing:** If activated the colors are interpolated smoothly across the mesh. If not activated a discrete color map is used.
- **Element Subdivisions:** select the level of element subdivision. When drawing the mesh in the *Graphics View* the elements are divided in sub-elements to improve the visual appearance of the mesh. Note that this has no effect on Tet-meshes (Tetrahedral meshes).
- **Displacement scale factor:** set the displacement scale factor.

Most of the options can also be set by invoking commands on the command line. See appendix A for a complete overview of the available commands.

5.2 Summary View

The Summary View displays an overview of minimum, maximum, and average values of different expressions. This summary of values can be calculated using only selected elements or nodes, or for the entire selection when no elements or nodes are selected. It can be opened by selecting the *Post/Summary* menu or by typing `summary` on the command line. Figure 7 shows the *Summary View* window.

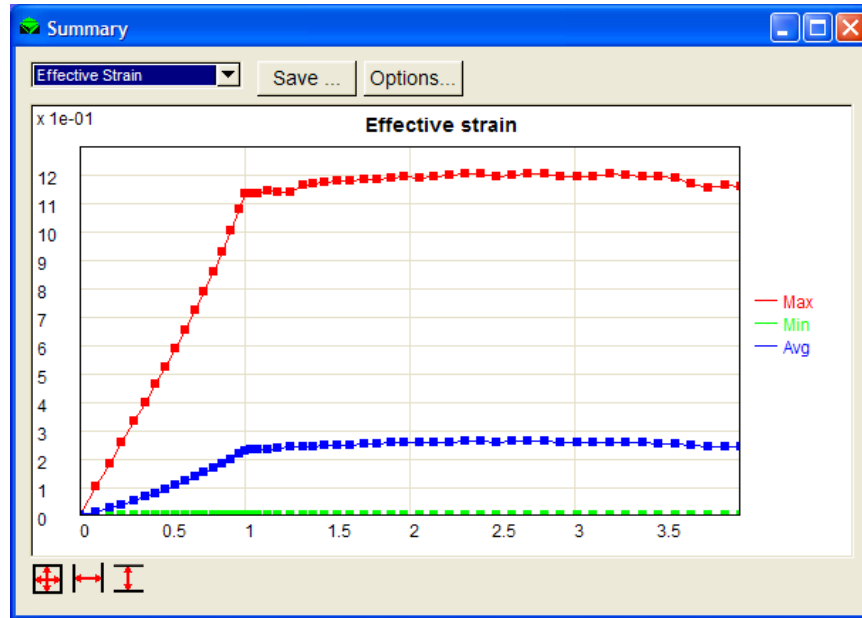


Figure 7. Summary View

To select the expression to display, click on the drop-down box in the upper left corner and select the desired expression. Each data point can be selected by clicking on it. The exact values will appear next to a selected data point.

To save the summary data to file, click the *Save* button located at the bottom of the *Summary View*. This will open the File Save dialog box. After the user enters a filename, the data is saved to file as a simple ASCII file. The *Options* button shows a dialog box where the user can change some options.

The graph area can be scaled or moved by click+dragging the right and left mouse button respectively. The buttons in the lower left corner of the Summary window can be used to restore the x-range, y-range or both.

5.3 Trackview

The Trackview can be used to show time history plots for individual elements or nodes. To display the trackview, select the *Post/Trackview* menu or type `track` on the command line. The Trackview should appear as in figure 8.

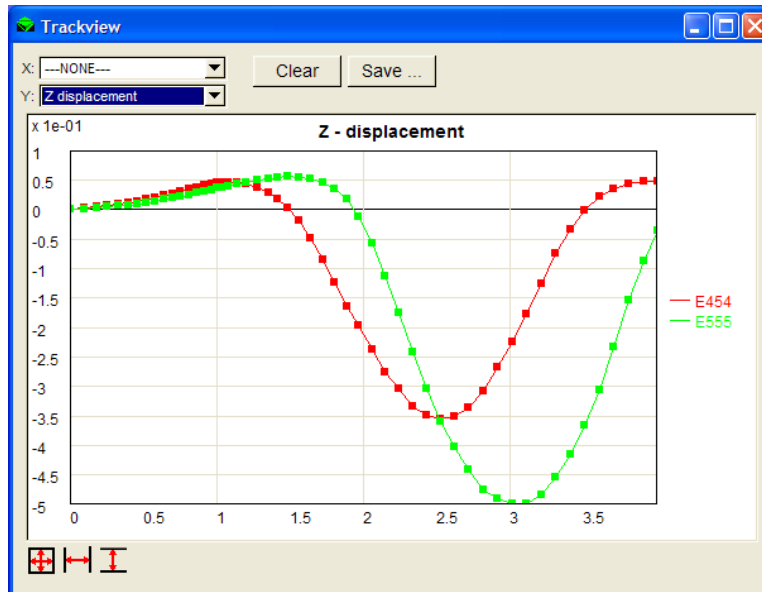


Figure 8. Trackview

The *Trackview* displays the selected expression for the selected mesh items (see below on how to select mesh items). On the right, the item numbers (preceded by an ‘E’ for ‘element’ or ‘N’ for ‘node’) are shown in the same color as the corresponding curve. The *Clear* button will clear the current selection. The *Save* button can be used to store the TrackView data to file.

The graph area can be scaled or moved by click+dragging the right and left mouse button respectively. The buttons in the lower left corner of the TrackView window can be used to restore the x-range, y-range or both.

5.3.1 Selecting mesh items

You can select both elements and nodes. The item that will be selected is controlled by the two selection buttons in the *Toolbar*:



Switches to node-selection-mode.



Switches to element-selection-mode.

To add an item to the current selection, just shift+click the node or element. When tags are enabled, a dot followed by the item’s number will appear next to the item. To enable the tags, type `tags` on the *command line*, or select the corresponding button in the *command bar*. To remove an item from the current selection, just ctrl+click the node or element. You can (de-) select multiple items at the same time by dragging the mouse cursor while holding down the shift or ctrl key and the left mouse button. A colored rectangle will appear indicating what elements or nodes will be selected. Note that only *visible* elements or nodes that fall inside this rectangle will be selected. This means that only elements or nodes on the surface of the mesh can be selected.

You can also use the command line to select items. For example, to select element 1000, type the following command on the command line:

```
>selelem 1000 [enter]
```

This will have the same effect as shift+clicking the element (if it is visible). However, by using the command line, you can also select non-visible elements.

The command for selecting nodes is

```
>selnode 2500 [enter]
```

To clear the entire selection, you can either push the clear button in the Trackview dialog box (if it is opened) or you can use the command line by typing:

```
>clrsel [enter]
```

When no other windows are open (such as e.g. Trackview, etc.), pressing the ESC-key also clears the selection. Finally, you can select the *Edit/Clear Selection* menu to clear the entire selection too.

Also note that the *Edit* menu lists several options to manipulate the current selection, such as hiding, un-hiding, inverting, etc.

5.4 Making Plane Cuts

The menu *Post/Plane Cut* opens the Plane Cut window. This window shows the intersection of a plane and the model. The intersecting plane is displayed in the Graphics View. The position of this plane can be controlled by sliding the scroll bar at the bottom of the Plane Cut window. The orientation (in x, y, z) is controlled by sliding the scrollbars at the top. This more accurately controls the plane normal. The roller on the right side of the window controls the rotation of the plane around its normal and can be used to position the plane cut in a more desired orientation.

The color and expression used to display the plane cut are the same as in the Graphics View. In order to change them you need to change the expression and/or color map in the Post Options dialog box (see section 4.1).

You can also look at local values by clicking on a specific point on the plane cut view. A cross mark with the local value will appear on the selected point. This is a useful way to inspect the local values.

The *Print* button at the bottom of the *Plane Cut* window allows the user to save the current view to file.

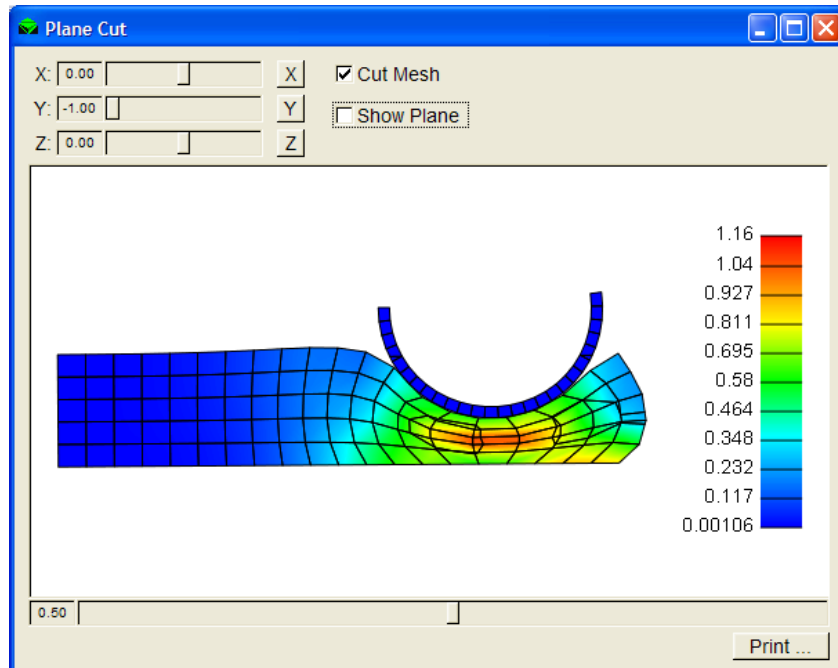


Figure 9. The Plane cut view. Clicking the mesh allows you to inspect local values.

5.5 The Material Manager

The material manager controls the visual properties of the different materials in the FE model. It is opened by selecting *Material Manager* from the *Post* menu, typing *mat* on the command line, or by using the F3 shortcut. The Material Manager window is shown in figure 10.

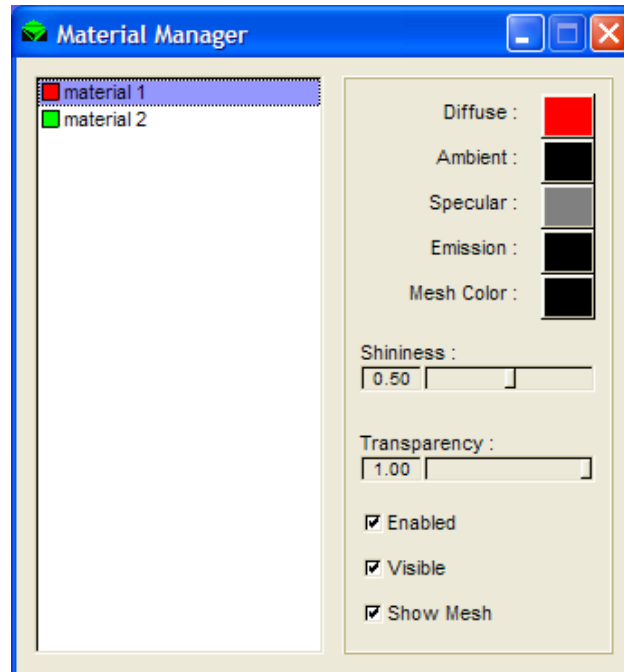


Figure 10. The Material Manager handles the appearance of the different materials.

The left pane displays a list of all the materials in the FE model. The colored square, preceding the material name, identifies the diffuse color of the material. The current material is highlighted with a light blue background and can be changed by clicking with the mouse on one of the other materials.

The right pane shows the settings that can be altered for the selected material. The options are:

- *Diffuse*: sets the diffuse color of the material. By clicking on the colored button, the Color Selector dialog is opened and the color can be changed. Closing the Color Selector will automatically update the color in the Graphics view. Note that the diffuse color is only used when no expression is selected or when the material is disabled.
- *Ambient*: sets the ambient color for the material. Click the colored button next to it to change the ambient color.
- *Specular*: sets the specular color for the material. Click the colored button next to it to change the specular color.
- *Emission*: sets the emission color for the material. Click the colored button next to it to change the emission color.
- *Mesh Color*: sets the mesh color for the material. Click the colored button next to it to change the mesh color.
- *Shininess*: sets the shininess value for the material. Slide the slide bar to change the shininess value.
- *Transparency*: sets the transparency value for the material. Slide the bar to change the transparency value.
- *Enabled*: If checked the material is enabled and the color of the material is determined by the local expression value. If unchecked the material will be disabled and displayed with its diffuse color.

- *Visible*: if checked, the material will be displayed in the GV.
- *Show Mesh*: if checked, the mesh lines will be drawn on top of the model.

5.6 Displaying user data

Besides displaying the expressions specified in the expression selector, the user can also display data that is imported from a file. This is achieved by using the `userdata` command. Up to five different user data files can be loaded. For example, the following command

```
userdata1 "Deviatoric xy stress" dev.txt
```

will load the data in the file `dev.txt` into the first user data buffer and give it a description. This description will show up in the expression list under the *user* menu and in the subtitle on the graphics view.

The data file should be a text file with two columns, separated by a space. The first column contains the one-based node number. The second column contains the nodal value.

5.7 The View Settings

The *View Settings* dialog box (fig. 11 below) controls the settings that affect the GV. You can invoke it by selecting the *View/Settings* menu or by typing `view` on the command line.

It allows you to select the following options:

- **Render style**: select a style with some predefined rendering settings.
- **Background color 1**: set the first background color. (The command line currently supports setting color to white, black, red, green, and blue).
- **Background color 2**: set the second background color. (The command line currently supports setting color to white, black, red, green, and blue).
- **Swap**: swaps the first and second background color.
- **Background style**: set the style of the background. The following are styles and corresponding commands: Color 1=`color1`, Color 2=`color2`, Fade Horizontal=`horz`, Fade Vertical=`vert`, Fade Diagonally=`diag`.
- **Foreground color**: sets the foreground color. That is the color of the title, the legend and the bounding box. (The command line currently supports setting color to white, black, red, green, and blue).
- **Enable Lighting**: Turn lighting on or off.
- **Ambient Lighting**: Set the overall ambient lighting of the scene.
- **Light Position**: Enter the global coordinates of the light in the scene.
- **Render shadows**: Render shadows cast by the objects in the scene, using the current light position. (*Enable Lighting* must be checked).
- **Shadow Intensity**: Set the shadow intensity as a number between zero and one.

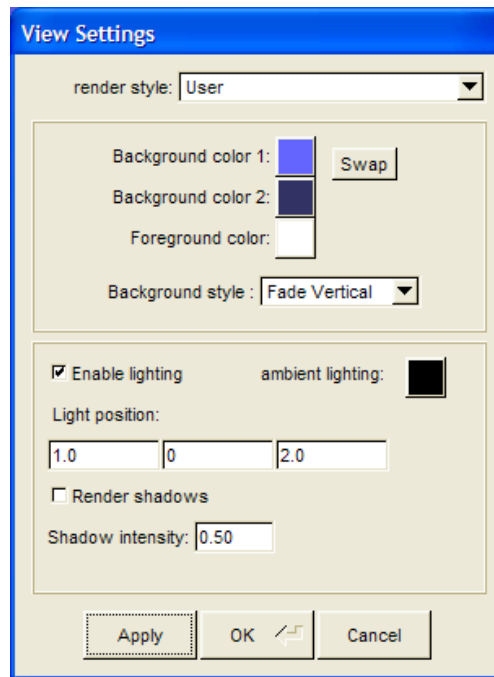


Figure 11. View Settings dialog box.

5.8 Saving Graphics

5.8.1 The Safe Frame

When storing graphics, it is important to understand the concept of the *safe frame*. The safe frame is the area of the screen that will be captured when taking a screen shot or recording an animation. The safe screen is not always visible, but can be displayed by selecting the *View/Toggle Safe Frame* from the menu. The same menu will hide it again. When visible, the safe frame can be moved and resized by selecting one of the borders and dragging the mouse button. To resize it, you must grab the little triangular area in the lower right corner of the safe frame. If you wish to specify the location and size more accurately, you can open the properties dialog box, by selecting the *Edit/Properties* menu or by double-clicking on one of its borders.

5.8.2 Taking a snapshot

To take a snapshot of the current Graphics View, select the *File/Snapshot* menu. Alternatively, you can press the *ctrl+p* shortcut or push the *snapshot* button on the toolbar. A standard Save dialog box appears and the desired filename can be entered or selected. Images can be saved as Windows Bitmap or TIFF images. In either case a 24 bit, uncompressed image is saved.

5.8.3 Recording an animation

PostView has the capability to record an animation of the current GV. **Note that this feature is currently only available under Windows.** To record an animation, first position and resize the safe frame so that it covers the desired area of the GV that will be captured. Next, select the *Animate/New* menu. This opens a standard file dialog box where you can enter the target filename. The file will be stored in the Windows AVI format. After selecting the OK button, a dialog box appears that allows you to select the compression type of the image.

After you have selected a target file, you are ready for recording. Note that the safe frame will now be locked, so you can no longer move or resize it. If it is visible, it will turn red. Also note the red text in the upper right corner of the screen which indicates the current recording state. The recording will begin in a paused state, allowing you to make some changes to the GV before recording begins.

To start recording, select *Animate/Start* from the menu or press the corresponding shortcut. Now, all the action in the GV will be recorded to the target file. For example, if you press the play button, the GV will loop over all timesteps and each step will be recorded to the file. You can also rotate the GV and this will also be recorded to the file.

To pause the recording, select *Animate/Pause* from the menu. To finally stop the recording, select *Animate/Stop* from the menu. This will close the target file and unlock the safe frame.

APPENDIX A – Commands

Here follows a list of all the commands recognized by PostView. A command can have no arguments, optional arguments or mandatory arguments. The general syntax is:

command [*optional arg*] <*mandatory arg*> [*option A* |*option B*],

where *command* is the name of the command, [a] indicates optional arguments, <a> indicates mandatory arguments, [a | b] indicates a list of choices.

! repeats the last command

? <*command*> provides help on a *command*, where *command* is the name of the command.

= <*expression*> invokes the command line calculator.

FILE COMMANDS

exit	Exits the application.
info	Displays information about the current model and plot file.
open [<i>filename</i>]	If <i>filename</i> is present, opens the file, otherwise opens the File Open dialog box.
print [<i>filename</i>]	Prints the current view to a file with name <i>filename</i> . If <i>filename</i> is omitted, the File Save dialog is opened.

POST/IMAGE COMMANDS

box [<i>on/off</i>]	Shows (on) or hides (off) the bounding box in the Graphics View.
color < <i>colormap</i> >	Sets the color map. Refer to section 4.1 for valid <i>colormap</i> commands.
cut	Displays the plane cut view.
range [<i>static/dynamic/user</i> < <i>min max</i> >]	Sets the range for the legend.
legend [<i>on/off</i>]	Shows (on) or hides (off) the legend in the Graphics View.
mat	Shows the material manager.
mesh [<i>on/off</i>]	Shows (on) or hides (off) the mesh.
options	Displays the post-options dialog box.
smooth [<i>on/off</i>]	Renders the model in smooth (on) or flat (off) shade.
summary	Displays the post-summary.
title [<i>on/off</i>]	Shows (on) or hides (off) the title in the Graphics View.
track	Displays the track view
triad [<i>on/off</i>]	Shows (on) or hides (off) the triad.
userdata(<i>n</i>) <" <i>description</i> "> [<i>filename</i>]	Loads user data from file.

TIME CONTROL COMMANDS

anim [<i>fps</i>]	Starts the animation, with optional framerate <i>fps</i>
first	Go to the first time step.
last	Go to the last time step.
next	Go to the next time step.

prev	Go to the previous time step.
stop	Stop the animation
time <time>	Go to <i>time</i> timestep, where <i>time</i> is a number between 1 and the max numbers of timesteps.

FIELD SELECT COMMANDS

eval <expression>	Evaluates the expression. Refer to Appendix B for valid <i>expression</i> commands.
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EDIT/SELECTION COMMANDS

clrsel	Clears the selection.
hide	Hides the current selection.
selelem <elem id>	Selects element with element id <i>elem id</i> .
selnode <node id>	Selects node with node id <i>node id</i> .
tags [on/off]	Shows (on) or hides (off) the selected item's tags.

TRANSFORM COMMANDS

back	Display back view.
bottom	Display bottom view.
front	Display front view.
left	Display left view.
right	Display right view.
pan <x> <y>	Sets the panning coordinates (x, y)
quat <x> <y> <z> <w>	Sets the orientation quaternion $q(x,y,z,w)$
rotx <angle>	Rotate angle degrees around the x-axis.
roty <angle>	Rotate angle degrees around the y-axis.
rotz <angle>	Rotate angle degrees around the z-axis.
top	Display top view.
zoom <z>	Sets the zooming coordinate (z)

VIEW COMMANDS

bg [color name r g b]	Set background color 1 either by name or RGB value (0-1).
bg1 [color name r g b]	Set background color 1 either by name or RGB value (0-1).
bg2 [color name r g b]	Set background 2 color either by name or RGB value (0-1).
bgstyle <style>	Set the background fading style. Refer to section 4.7 for valid style commands.
fg [color name r g b]	Set foreground color either by name or RGB value (0-1).
view	Options the view settings dialog box.

HELP COMMANDS

about	Displays the about box.
help	Displays the PostView help window.

APPENDIX B – Expressions

Expression Field	Description	Command
Displacement:		
X displacement	Displays displacement in the x direction	xdispl
Y displacement	Displays displacement in the y direction	ydispl
Z displacement	Displays displacement in the z direction	zdispl
XY displacement	Displays displacement as the xy shear	xydispl
YZ displacement	Displays displacement as the yz shear	yzdispl
XZ displacement	Displays displacement as the xz shear	xzdispl
Total displacement	Displays total displacement	displ
Velocity:		
X velocity	Displays x component of velocity	xvel
Y velocity	Displays y component of velocity	yvel
Z velocity	Displays z component of velocity	zvel
XY velocity	Displays xy component of velocity	xyvel
YZ velocity	Displays yz component of velocity	yzvel
XZ velocity	Displays xz component of velocity	xzvel
Total velocity	Displays total velocity	vel
Acceleration:		
X acceleration	Displays x component of acceleration	xacc
Y acceleration	Displays y component of acceleration	yacc
Z acceleration	Displays z component of acceleration	zacc
XY acceleration	Displays xy component of acceleration	xyacc
YZ acceleration	Displays yz component of acceleration	yzacc
XZ acceleration	Displays xz component of acceleration	xzacc
Total acceleration	Displays total acceleration	acc
Strain:		
X strain	Displays strain in the x direction	xstrain
Y strain	Displays strain in the y direction	ystrain
Z strain	Displays strain in the z direction	zstrain
XY strain	Displays strain as the xy shear	xystrain
YZ strain	Displays strain as the yz shear	yzstrain
XZ strain	Displays strain as the xz shear	xzstrain
Effective strain	Displays effective stain	vmstrain
Principle strain 1	Displays first principle strain component	e1
Principle strain 2	Displays second principle strain component	e2

Principle strain 3	Displays third principle strain component	e3
Prin dev strain 1	Displays first principle deviatoric strain component	e1dev
Prin dev strain 2	Displays second principle deviatoric strain component	e2dev
Prin dev strain 3	Displays third principle deviatoric strain component	e3dev
Max shear strain	Displays texture strain as the maximum shear	maxe
Plastic strain	Displays texture strain of plastic	plast
Stress:		
X stress	Displays stress in the x direction	xstress
Y stress	Displays stress in the y direction	ystress
Z stress	Displays stress in the z direction	zstress
XY stress	Displays stress as the xy shear	xystress
YZ stress	Displays stress as the yz shear	yzstress
XZ stress	Displays stress as the xz shear	xzstress
Von Mises stress	Displays as a Von Mises stress	vmstress
Principle stress 1	Displays first principle stress component	s1
Principle stress 2	Displays second principle stress component	s2
Principle stress 3	Displays third principle stress component	s3
Prin dev stress 1	Displays first principle deviatoric stress component	s1ev
Prin dev stress 2	Displays second principle deviatoric stress component	s2dev
Prin dev stress 3	Displays third principle deviatoric stress component	s3dev
Max shear stress	Displays stress as the maximum shear	maxs
Pressure stress	Displays stress resulting from pressure	press
Other:		
Temperature	Displays temperature	temp
Shell Thickness	displays the shell thickness	sthick
Volume Ratio	displays volume ratio ($=V/V_0=\det(F)$)	J
Quality:		
volume	displays the element volume	vol
max edge angle	displays the max element edge angle	maxedge
min edge angle	displays the min element edge angle	minedge
aspect ratio	displays the element aspect ratio	ar